CLAIMS

We claim:

1.   An integrated on-line system with an enhanced data transfer protocol for transferring data on a TCP/IP network, comprising at least one computer configured as a data transfer server connected to the network, the data transfer server having:

(a) a web server means for providing a plurality of clients with a browser-based interface with said data transfer server;

(b) a relational database, said web server communicating with the database for retrieving and recording information, said database having means for establishing and maintaining an electronic mailbox for a plurality of clients; and

(c) a data transfer protocol means for providing a socket to socket connection with a client for the transfer of data according to an enhanced data transfer protocol, said protocol means having:

(i) means for receiving data from a first client and a request to forward the data to a second client;

(ii) means for immediately transferring the data to the second client when the second client is connected to said data transfer server by a socket when the data is received by said data transfer server;

(iii) means for storing the data in an electronic mailbox when the second client is not connected to said data

24   transfer server when the data is received by said data

25   transfer server; and

26   (iv) means for recording the receipt and transfer of data

27   in said relational database.

1   2.   The integrated on-line system according to claim 1,

2   further comprising means for registering a plurality of trading

3   partners as clients permitted to use the system for transferring

4   data.

1   3.   The integrated on-line system according to claim 1,

2   wherein said data transfer protocol means further comprises means

3   for notifying the first client when the data transfer server

4   receives the data sent by the first client.

1   4.   The integrated on-line system according to claim 1,

2   further comprising means for permitting a client to determine the

3   status of a data transfer recorded in said relational database

4   through said web server means.

5.   The integrated on-line system according to claim 1, wherein said data transfer protocol means further comprises:

(a) means for permitting a client to connect to said data transfer protocol means for a send session, wherein the client transfers data to the server for transfer to a second client and the session ends;

(b) means for permitting a client to connect to said data transfer protocol means for a receive session, wherein the client receives data from the server sent by a second client and the session ends; and

(c) means for permitting a client to connect to said data transfer protocol means for an end-to-end session, wherein the client transfers data to the server for transfer to a second client and said data transfer server keeps the session open for an immediate response from the second client.

6.   The integrated on-line system according to claim 1, wherein said data transfer protocol means further comprises means for validating a header sent by a client against information recorded in said relational database, the header including identification of a client's electronic mailbox, and means for terminating a socket connection before receiving a data transfer upon failure of the validation.

7.   The integrated on-line system according to claim 1, further comprising:

(a) a plurality of client computers connected to the network; and

(b) client software means residing on said client computers for communicating with said data transfer server according to said enhanced data transfer protocol, said client software means including means for establishing a socket to socket connection with said data transfer server for the transfer of data according to an enhanced data transfer protocol, said client software means further including means for sending a header to said data transfer server, the header encoding a type of session requested, an identification of the client's electronic mailbox, and an optional identification of a recipient client's electronic mailbox.

8.   The integrated on-line system according to claim 7, wherein said client software means is platform independent for integration into any application residing on said client computer.

9.   The integrated on-line system according to claim 1, further comprising encryption means for encrypting data sent to and from said data transfer server.

1   10.   The integrated on-line system according to claim 1,

2   further comprising:

3   (a) data encryption means for encrypting data based upon

4   a data key; and

5   (b) header encryption means for encrypting header data

6   based upon a header key, the header data including the data

7   key.

1   11.   The integrated on-line system according to claim 10,

2   further comprising means for changing the header key from session

3   to session, including means for initializing and re-initializing

4   the header key.

12. A computerized method for enchanced data transfer between a plurality of clients through a data transfer server in a TCP/IP network, comprising the steps of:

(a) providing the server with a web server and a relational database;

(b) registering a plurality of trading partners as clients through said web server, including establishing an electronic mailbox, assigning a unique mailbox ID, and a password for each client and recording the mailbox ID and password in said relational database;

(c) listening for a client on a port dedicated to providing enhanced data transfer service;

(d) receiving a header from a client, the header containing at least the client's mailbox ID and password and a session request;

(e) validating the mailbox ID and password against said relational database;

(f) creating a socket to socket connection with the client upon validating the mailbox ID and password;

(g) when the session request is for receiving at least one data transfer, transferring the data to the client and recording the transfer in said relational database;

(h) when the session request is for sending at least one data transfer, receiving a data transfer including a header, the header having a receiving client's mailbox ID;

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26   (i) sending the client an acknowledgement that the server

27 has received the data transfer;

28   (k) determining whether the receiving client is currently

29 connected to the server, and if so, notifying the receiving

30 client of a pending data transfer and transferring the data to

31 the receiving client immediately and before disconnecting with

32 the receiving client;

33   (l) saving the data transfer in the receiving client's

34 mailbox when the receiving client is not currently connected

35 to the server;

36   (m) recording the server's receipt of the data transfer,

37 the server's transfer of data to a receiving client, and the

38 server's mailbox storing of a data transfer in said relational

39 database; and

40   (n) terminating the socket to socket connection with the

41 client.

1   13. The method according to claim 12, further comprising the

2 step of permitting a client to query said relational database

3 through said web server concerning status of data transfers to and

4 from the client.

14. The method according to claim 12, further comprising the steps of notifying the receiving client that a response is requested, keeping the socket to socket connection open pending a response, and transferring a response to the client when an end-to-end session is requested.

15. The method according to claim 12, further comprising the steps of:

(a) prior to step (d), negotiating a header encryption key between client and server;

(b) before step (e), decrypting the header using the header encryption key, the header further comprising an encrypted portion having a second header encryption key for use in a client's next session, and when the session request is for a sending session, an encrypted data key for transfer to a receiving client.

16. The method according to claim 15, further comprising the step of transmitting an encrypted header containing the data key for decrypting the data transfer prior to transferring the data in step (g).

17. A computerized method for transferring encrypted data between a sending client, a receiving client, and a server in a TCP/IP network, comprising the steps of:

(a) negotiating a sender's initial header key between the sending client and the server;

(b) negotiating a receiver's initial header key between the receiving client and the server;

(c) the server receiving a header from a sending client having header data encrypted based upon the sender's header key, the header data having a data key;

(d) the server decrypting the header and transmitting an acknowledgement to the sending client;

(e) the server receiving a data transfer from the sending client, the data transfer being encrypted based upon the data key;

(f) the server transmitting a second header to the receiving client, the second header having header data encrypted based upon the receiver's header key, the header data having the data key; and

(g) the server transmitting the data transfer to the receiving client, the data transfer being encrypted based upon the data key

whereby the data key is passed from the sending client to the server encrypted by the sending client's header key and from the server to the receiving client encrypted by the receiving client's header key, the data encrypted by the data key being transferred

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27   from the sending client to the receiving client without decryption

28   by the server.

1   18.   The method according to claim 17, further comprising the

2   step of updating the sending client' header key, the sending client

3   encoding a new header key in the encrypted header data received by

4   the server in step (c).